

**POLICY MODELLING FOR COAL
DEVELOPMENT IN VIETNAM**

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by

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ABSTRACT

Coal is a strategic energy and economic resource for Vietnam. While the production and use of coal has been increasing steadily over the years, its relative importance has been declining rapidly. It is customary in Vietnam – as indeed elsewhere – to search for causes for such decline within the coal industry and to suggest remedies which are industry specific. This paper argues that this industry-oriented approach might provide only limited long term benefits, as it does not address the real causes of industry decline. The real causes of industry decline relate to issues that emerge at the interface of politics, economics and technology. And it is the addressal of these issues that will ensure the long term prosperity of the coal industry. This task could be facilitated by comprehensive policy modelling and analysis for coal in the Vietnamese context. A broad conceptual framework for such modelling is outlined in this paper.

INTRODUCTION

Coal is a strategic energy and economic resource for Vietnam. While its production and use has been increasing in quantitative terms, its relative importance has been declining rapidly. This decline is expected to continue in future. This is a matter of concern for the Vietnamese planners, especially when viewed in the context of the strategic nature of coal for the economy.

There is clearly a need to gain further insights into the real issues confronting the coal industry so that appropriate strategies can be developed to ensure the long term survival and growth of the industry. This paper presents an approach for gaining such insights.

The next section of the paper provides an overview of the strategic nature of the Vietnamese coal industry. This is followed by a discussion on the nature of current thinking on possible causes for industrial decline and the recommended remedies for the revival of the industry. The limitations of this approach are discussed next. A framework for comprehensive analysis of coal industry issues is presented in the last sections of the paper.

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COAL – A STRATEGIC ENERGY RESOURCE FOR VIETNAM

Vietnam is endowed with substantial reserves of coal. The in situ reserves of coal comprise: 3 bn tons (300-1000 meters); 3.5 bn tons (300 meters); and 660 mn tons (100 meters). Of the latter, 250 mn tons are considered accessible by open-pit methods and the rest through underground operations. Further, approximately 440 mn tons of coal is considered to be presently economically recoverable (IE, 1995; WB, 1998).

Vietnamese coal is predominantly anthracite (97%). It has a high calorific value, and low ash and sulphur contents. It is therefore particularly suited to thermal power generation. Vietnam currently has 40 percent share of the global market for anthracite (WB, 1998).

Vietnam's coal industry is predominantly state owned. Vinacoal – the principal organization responsible for coal resource development – comes under the administrative control of the State Ministry of Industry (MoI). Besides coal, Vinacoal is involved in the administration of several other interests including materials transport, civil construction, import-export, explosives manufacturing, engineering works, tourism, education and industrial training (WB, 1998).

The Vietnamese coal industry currently provides direct employment to nearly 80 000 people, and indirectly to several times more. Coal has been a useful source of export income for Vietnam, accounting for approximately 8 percent of annual energy export income over the period 1990-97 (WB, 1998).

Coal has historically occupied a strategic place in the Vietnamese energy industry and economy generally. This importance is reflected in its dominant position as fuel for electricity production, industry and residential sectors (see Table 2). This importance would appear even more enhanced if one takes note of the strategic role played by coal during the war years.

PRODUCTION AND USE OF COAL IS INCREASING

Table 1 shows that between 1985-89 and 2000-10, the average annual:

- a) production of indigenous coal as percentage of total indigenous energy production will increase from 2923 to 5300ktoe;
- b) consumption of coal as final energy resource will increase from 1612 to 3262ktoe;
- c) coal input for electricity production will increase from 1084 to 1688ktoe.

Table 1 Coal production and use in Vietnam

	ktoe/year			
	1985-89	1990-94	1995-99	2000-10
Production	2923	2727	3271	5300
Exports	226	678	2036	NA
Final energy	1612	1577	2435	3262
Industry	1305	1291	1412	1920
Residential	252	257	549	1244
Electricity	1084	471	940	1688

Sources: IE (1995); WB (1998); Others

RELATIVE IMPORTANCE OF COAL IS HOWEVER DECLINING

Notwithstanding this optimism in the production and use of coal, its relative importance as energy resource (i.e., relative to other energy resources) has been declining rapidly. This decline is projected to continue in the next decade. Table 2 and Figure 1 show that between 1985-89 and 2005-09 the annual average percentage share of:

- a) indigenous coal in total indigenous energy production will decline from 73 to 11, while oil will increase from 10 to 56, and gas from nil to 15;
- b) net supply of coal as primary energy resource (i.e., net of imports and exports) will decline from 47 to 18, and gas will increase from nil to 19;
- c) coal as final energy resource will decline from 41 to 12, as oil increases from 49 to 65, electricity from 10 to 18, and gas from nil to 5;
- d) coal as input for electricity production will decline substantially, from 50 to 14, while gas will increase from nil to 32, and hydro from 30 to 52;
- e) coal as energy input for the industrial sector will decline significantly (65 to 11), whereas oil will increase equally significantly (24 to 62), and electricity and gas from 11 to 19 and nil to 8, respectively.

There is clearly a shift away from coal to oil and gas. It is also interesting to note that approximately 50 percent of oil (i.e., petroleum products) to meet future energy needs is imported (Figure 1).

Table 2 Relative importance of coal

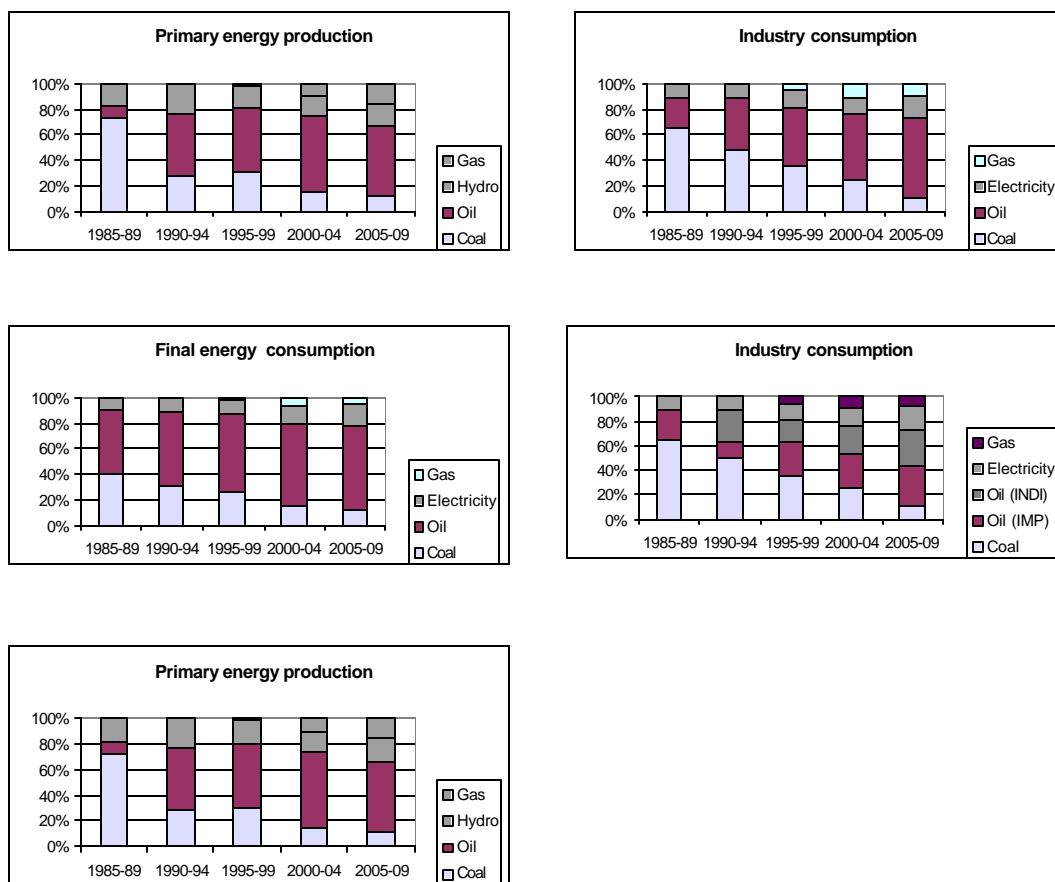
		(percentage shares)				
		1985-89	1990-94	1995-99	2000-04	2005-09
Indigenous primary production	Coal	73	28	30	15	11
	Oil	10	49	51	60	56
	Hydro	17	23	18	16	18
	Gas	0	0	1	9	15
Primary energy supply	Coal	47	26	26	22	18
	Oil	40	44	46	43	42
	Hydro	13	30	27	22	21
	Gas	0	0	1	13	19
Final energy consumption	Coal	41	31	26	15	12
	Oil	49	57	61	65	65
	Electricity	10	12	12	14	18
	Gas	0	0	1	6	5
Electricity production	Coal	50	17	19	22	14
	Oil	20	13	8	2	2
	Hydro	30	70	67	54	52
	Gas	0	0	6	24	32
Industry consumption	Coal	65	49	35	26	11
	Oil	24	40	47	50	62
	Electricity	11	11	13	14	19
	Gas	0	0	5	10	8
Residential & Commercial consumption	Coal	33	22	23	26	28
	Oil	47	55	52	35	28
	Electricity	20	23	25	39	44
	Gas					

Sources: IE (1995); WB (1998); Others

THIS DECLINE IS A MATTER OF CONCERN

In view of the abundance of good quality coal and its strategic importance as energy and economic resource in the Vietnamese context, this decline in relative importance of coal should be a matter of concern for the economy's planners. There is therefore a need to first develop understanding about the causes of industrial decline and then to apply remedies to correct the situation.

Figure 1 Fuel Shares



CONVENTIONAL WISDOM – CAUSES FOR DECLINE ARE INDUSTRY-SPECIFIC

A review of various reports and documents, discussions with Vietnamese energy officials working in (or familiar with) the coal industry suggests that there is a tendency to confine discussion on such causes to coal industry alone. The following excerpts provide a gist of the underlying reasoning (for further details, see IE, 1995; ECFA, 1995; WB, 1995; WB, 1998; Mekong Research - various issues):

‘... lack of investment by potential investors... low mechanization in coal mining, production and processing... backward and obsolete technology... railway system too weak, unbalanced... rapid degradation of coal transport route system in coal mining areas... insufficient loading and unloading capacities... old technologies... coal processing enterprises-the weakest link... inadequate water supply in coal mining areas... no treatment of water discharge from coal mining areas... weak communication systems... insufficient concerns on environmental, hygienic and safe working conditions... coordination and logistical problems... coal dumping in the domestic market by privately and military owned coal mines... overstaffing... politically administered pricing... high coal carriage... investment insufficiency... violation of mining regulation... absence of orientation and policies on rural coal supply... land law and associated land use and property rights – major bottlenecks...’

The review also reveals that these views on causes of industrial decline have apparently been formed largely on the basis of a somewhat fragmented analysis whereby answers to various problems are sought within the coal industry (or, worse, segments of it) and often through recourse to indefensible premises (for example, across economy comparisons of productivities, costs, prices).

SUGGESTED REMEDIES ARE THEREFORE INDUSTRY-SPECIFIC

The nature of remedies to overcome such problems are, accordingly, industry specific. For example, redefining land rights to facilitate participation by overseas mining companies, removing coal subsidies, providing market-orientation to Vinacoal, developing effective regulation for coal industry, replacing old technology with more efficient imported technology, expediting decision making for coal projects. These remedies – although inherently extremely valuable - are however likely to provide only limited benefits for the longer term survival and growth of the coal industry as they do not address the real causes for industry decline.

REAL CAUSES FOR INDUSTRY DECLINE HAVE FUNDAMENTAL ORIGINS

The real causes for the decline of the coal industry are fundamental. They generally relate to issues that emerge at the interface of politics, economics, and technology, e.g., geo-politics, country's sovereignty, regional strategic balance, employment, rural-urban mix, income distribution, equity and justice. The understanding and satisfactory addressal of these issues are therefore prerequisites for improving the prospects of longer term health of the coal industry.

COMPREHENSIVE COAL POLICY MODELLING FRAMEWORK IS NEEDED

Such tasks could be assisted by developing a comprehensive framework which will allow: a) a satisfactory representation of the various dimensions (political, social, economic, environmental, technical) of coal industry issues, and b) a defensible methodology for analyzing and resolving issues which emerge from the interaction of such dimensions.

While the form and scope of such policy modelling framework would obviously depend on specific policy issues under consideration, it should typically comprise three interlinked models, namely, technical, economic and political.

The *technical* model will allow a complete representation of the energy system in Vietnam, with particular emphasis on representing the interrelationships between its various segments (see Figure 2, for example). It will obviously require characterization of various technologies associated with different fuel chains.

Such models are generally amenable to analysis through standard mathematical optimization techniques. Typical questions addressed through this approach include:

- a) what is the minimum cost of meeting pre-specified energy end use demands of various sectors in the economy subject to a set of constraints (e.g., limits on - imported oil, carbon emissions, quality and quantity of electricity, maximizing the use of existing coal transportation network);
- b) what are the possibilities of substitution of imported oil by indigenous coal and what is the associated cost;
- c) what is the impact on coal demand of improvements in efficiencies of industrial boilers?

This modelling is generally the forte of technical experts in energy organizations. The main limitations of this focus of modelling is that it will not provide any insights into the wider economic impacts of various energy scenarios, for example:

- a) what is the impact of a low coal scenario on direct and indirect employment in the economy;
- b) how will the closure of mining activities in a particular region affect the rural-urban mix;
- c) what are the economic impacts of cost based pricing on end use demands for various fuels and on country's trade balance;
- d) how will income distribution among various segments of society change due to excessive reliance on gas and petroleum products?

The understanding about such issues is generally gained through energy-*economic* modelling. This modelling is of special interest to the national planners and decision makers.

The insights gained through economic modelling are however inadequate for *political* decision making. Political decisions involve complex tradeoffs! The paramount influences at this level include: a) ideologies, philosophies, dogmas, and exigencies, and b) national and regional sovereignty, political control, rural-urban mix, income distribution among various segments of society, employment, equity and justice. While it is true that these influences are

difficult to model with exactitude, due mainly to the complexity of political decisions, but exactitude is neither required nor desirable. After all what one seeks from this exercise is some broad policy direction which is commensurate with the prevalent political opinion. And there is enough literature and modelling experience around the world (including for developing countries) to support such modelling efforts.

POINTERS FROM PRELIMINARY ANALYSES

The analysis of preliminary results obtained from early energy modelling efforts for Vietnam¹ have reinforced our views on the need and immediacy of developing a comprehensive modelling framework for Vietnam. Preliminary analyses suggest that:

- a) the employment impacts of coal industry restructuring will indeed be significant and widespread;
- b) increasing the future share of coal as fuel source for electricity generation could be beneficial for achieving the right balance in electricity generation and energy system generally;
- c) an increase in the rate of coal usage now could provide a strategic leverage to Vietnam during any future international negotiations on emission quotas and permits, as these are likely to be based on present emissions;
- d) the present policy of increased reliance on imported petroleum products at the expense of coal to meet existing and future energy needs should be reexamined.

IMMEDIACY OF POLICY MODELLING EFFORTS

The energy and other industries in Vietnam are currently in the throes of profound and rapid change. The existing approach to decision making on coal matters – motivated somewhat by short term, narrow considerations – might not be adequate for reversing the declining trend in the coal industry. Time is indeed ripe to undertake a comprehensive policy study for the coal industry. Such study could also provide strategically useful inputs for securing a better deal for the coal sector at the 9th Party Congress of Vietnam in 2001.

SUMMARY

Coal is a strategic energy and economic resource for Vietnam. While the production and use of coal has been increasing steadily over the years, its relative importance has been declining rapidly. It is customary in Vietnam – as indeed elsewhere – to search for causes for such

¹ A more comprehensive work – relating to the overall energy industry in Vietnam – is currently underway at the University of Technology, Sydney

decline within the coal industry and to suggest remedies which are industry specific. This paper argues that this industry-oriented approach might provide only limited long term benefits, as it does not address the real causes of industry decline. The real causes of industry decline relate to issues that emerge at the interface of politics, economics and technology. And it is the addressal of these issues that will ensure the long term prosperity of the coal industry. This task could be facilitated by comprehensive policy modelling and analysis for coal in the Vietnamese context. A broad conceptual framework for such modelling is outlined in this paper.

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